The Clean Air Act and the Economy

Employment, Welfare, Ecology and Health of the American People

2/11/11

Outline

- Benefits and Costs of the Clean Air Act
- Impacts of the Clean Air Act on Employment
- Pollution Control Costs, Competitiveness, and the Clean Air Act

Benefits and Costs of the Clean Air Act

The Clean Air Act Protects Public Health

- Example: Clean Air Act (1970-1990)

Health Problems	Annual Cases Avoided
Premature Mortality	205,000
Heart disease	22,000
Chronic Bronchitis	674,000
Hospital Admissions	209,000
Hypertension	12,600,000
Stroke	10,000
Acute Bronchitis in Children	8,700

Source: EPA Retrospective Analysis (1970–1990) Emissions Reductions

Clean Air Protects Worker Productivity

In 2010:

- 84 million fewer days with restricted activity
- 13 million fewer work days lost to ill health
- Fewer days lost caring for sick children, parents or other relatives

Source: EPA Prospective Analysis (1990-2020)

Clean Air Protects Skilled Workers

- Rule: Lead NAAQS
  - Estimated impacts:
    - By 2016, the US population's total IQ points will increase by approximately 400,000 points.
- Rule: Lead Renovation and Repair Rule
  - Estimated impacts:
    - Reduced exposure for 1.4 million children
    - Cognitive improvements in the children, including future earnings increases of $700 million to $1.7 billion per year.

Clean Air Reduces Health Care Costs: Pediatric Disease

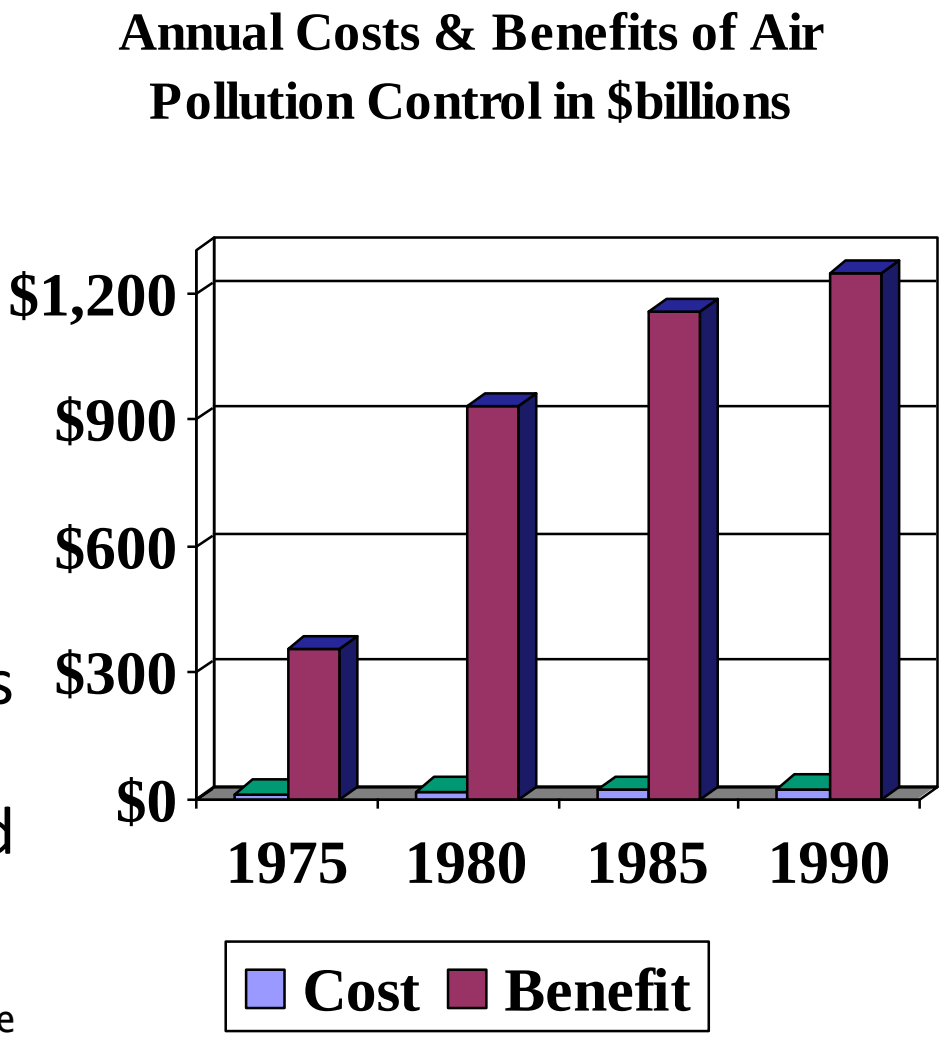
- Environmental pollutants contribute significantly to the cost of pediatric disease in American children: $54.9 billion.
  - This total, which does not include all environment-related illness accounts for 2.8% of total US health care costs.

Pediatric Illness	Annual Costs
Lead poisoning	$43.4 B
Asthma	$2.0 B
Childhood cancer	$0.3 B
Neurobehavioral disorders	$9.2 B
TOTAL	$54.9 B

Source: Landrigan et al 2002

Benefits and Costs of Air Pollution Control

- Clean Air Act (1970-1990)
  - 1990 Annual Costs: $26 billion
  - 1990 Monetized Annual Benefits: $1,248 billion
  - Not all health benefits are monetized (e.g. birth defects and child respiratory illness)

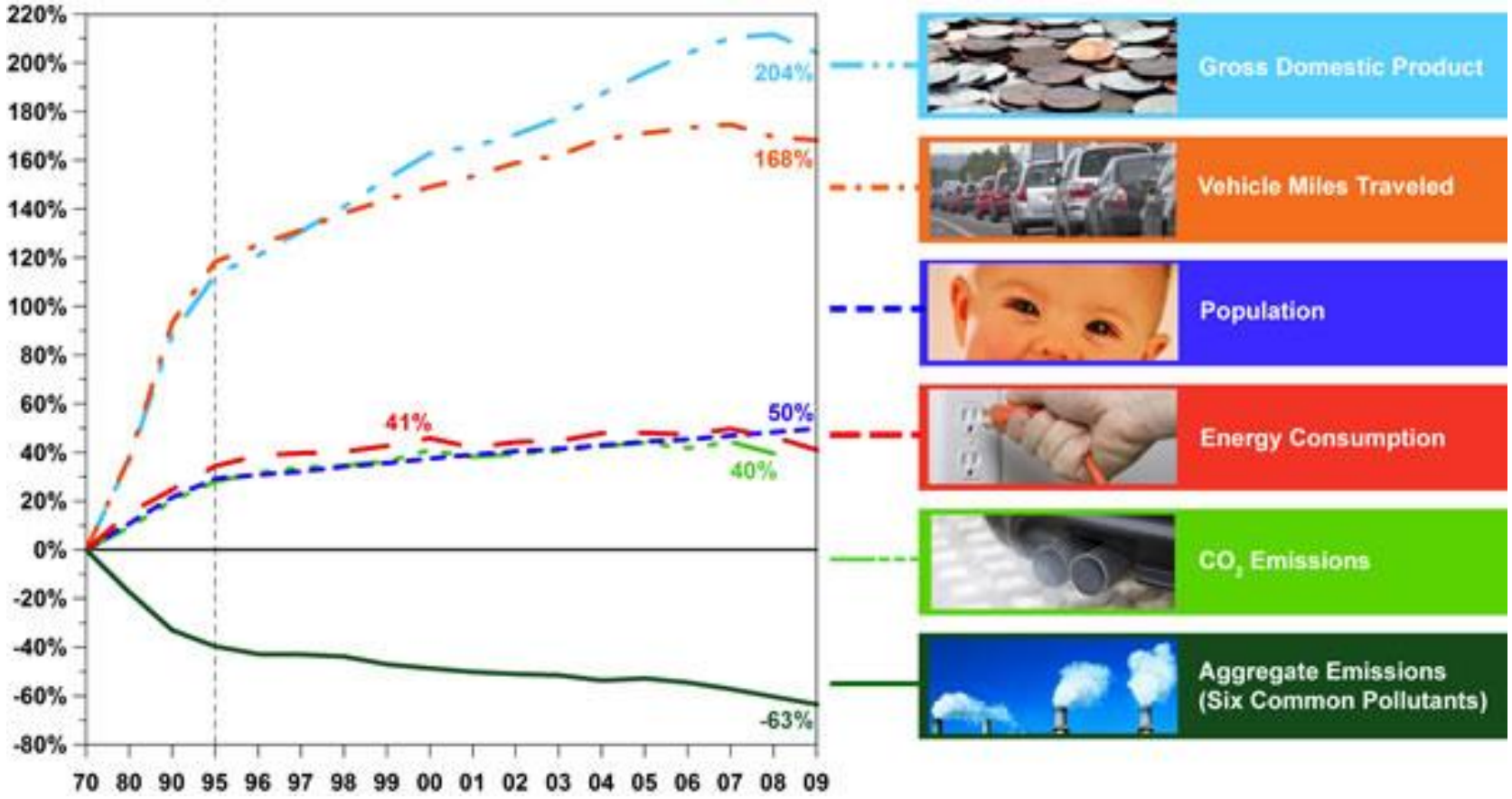


Source: U.S. EPA, The Benefits and Costs of the Clean Air Act 1970 to 1990, October 1997.

Benefits Outweigh the Costs

- OMB Reports to Congress on the Benefits and Costs of Federal Regulations
  - All ten rules (2008-2010) had benefits exceeding costs (comparing midpoints of the cost and benefit ranges).
  - In aggregate, total benefits were 7 times the costs
- EPA's prospective analysis of the Clean Air Act projects $2 Trillion in benefits in 2020, at a benefit to cost ratio of over 30 to 1.

Benefits Support Robust Economic Growth By Reducing Pollution



EPA, Our Nation's Air – Status and Trends through 2008, Feb 2010

Employment and the Clean Air Act

Peer-Reviewed Research on Environmental Protection and Jobs

- Morgenstern et al (2002)

  "We find that increased environmental spending generally does *not* cause a significant change in employment. Our average across all four industries is a net gain of 1.5 jobs per $1 million in additional environmental spending…. These small positive effects can be linked to labor-using factor shifts and relatively inelastic estimated demand."

- Bezdek et al (2008)

  "Contrary to conventional wisdom, EP, economic growth, and jobs creation are complementary and compatible: Investments in EP create jobs and displace jobs, but the net effect on employment is positive…at the state level, the relationship between environmental policies and economic/job growth is positive, not negative."

The Full Picture for Employment

- Rigorous analysis needs to examine at least three areas:

  1. The Regulated Industry

  2. The Environmental Protection Industry (control equipment)

  3. Upstream industries provide goods and services to the environmental protection industry (e.g., steel, raw materials, blowers, filters, pumps, fabricators etc.)

  Plus, a cleaner environment generates a healthier, more productive workforce and supports a more productive economy

1. Employment in Regulated Industries

- Morgenstern, Pizer and Shih (2002)
  - Examined four industries (Pulp and Paper, Plastic, Refining, Iron and Steel)
  - "**We find that increased environmental spending generally does *not* cause a significant change in employment.** Our average across all four industries is a net gain of 1.5 jobs per $1 million in additional environmental spending…. These small positive effects can be linked to labor-using factor shifts and relatively inelastic estimated demand."
- Berman and Bui (2001)
  - Large increases in abatement costs for NOx in Los Angeles did not result in substantially reduced employment.

2. Employment in the Environmental Protection Industry

- The money spent to reduce pollution does not disappear from the economy
- Ordering new control equipment is often industry's first response to regulation
- Orders create jobs in the environmental protection industry

2. Employment in the Environmental Protection Industry

- Environmental protection industry in 2008:
  - Revenues: $300 billion
  - Direct employment: 1.7 million employees
  - Direct + indirect employment: 3.8 million employees (some estimates as high as 5 million)
  - For comparison, 4-5 million employees in Transportation and Warehousing Sector

Environmental Business International (2010), Bezdek (2008)

Example of Job Creation - Manufacture, Installation and Operation of a Scrubber

- One-time employment impacts (annual equivalent FTE's) to manufacture and install a single scrubber
- 848-1,001 for med/large utility boilers
- 409-493 for small utility boilers

- Long term employment for the operation, maintenance, and administrative support for each scrubber over its full lifetime of operation (20-30 years):
- 103 jobs for med/large utility boiler
- 39 jobs for small utility boilers

Source: Jason Price, Nadav Tanners, Jim Neumann (IEc) and Roy Oomen (ERG), Employment Impacts Associated with the Manufacture, Installation and Operation of Scrubbers, Memo to Ellen Kurlansky, EPA, January 15, 2010.

3. Employment in Upstream Industries

- Production of pollution control equipment requires intermediate products.
  - E.g., steel, tanks, vessels, blowers, pumps, chemicals
- New orders of pollution control equipment create jobs in these industries.
- It is estimated that for every job in the EP industry there are 2.25 jobs in upstream industries.

Nestor and Pasurka (1995)

Why Do Industry Studies Get Such Different Answers?

		Estimated Impacts of Regulation		
Source	**EPA Rule(s)**	**Direct Costs**	**Employment Losses/Risks**	**Other Indicators**
EPA RIA	Boiler MACT (proposal)	$1.8 B (major source NESHAP) $0.5 B (area source NESHAP)	-3K to +6K jobs (major source NESHAP) -1K to +2K jobs (area source NESHAP)	Net benefits of rules $18-53 billion
Council of Industrial Boiler Owners (CIBO)	Boiler MACT	$9.3-$51.5 B (upgrades and compliance)	**152,552-798,250 jobs "at risk"**	Lost labor income: $6.9-$38.0 B
American Forest and Paper Association	A. Boiler MACT B. Boiler MACT + other pending CAA rules	A. $4.6 B (capital) and $560 M (operating) B. $12B (capital) and $2.8 B/yr (operating)	**A. 16,888 jobs in P&P mills, 71,774 total** **B. 43,666 jobs in P&P, 185,581 total**	Mills "at risk": A. 30 mills B. 92 mills
Manufacturer's Alliance (MAPI)	Ozone NAAQS –60 ppb	$1.013 T per year (2020-2030)	**7.3 M jobs lost by 2020 (4.3% of projected labor force)**	GDP : Decrease $676.8 B in 2020 (3.6% of projected GDP)

Why Do Some Industry Analyses Lead to Such Different Predictions?

- High estimates of compliance costs ("Cadillac" technology rather than innovation)
- Directly translate full costs to lower demand and an equivalent reduction in workforce (an assumption not supported by peer-reviewed studies such as Morgenstern (2002))
- Ignore jobs created building, installing, and maintaining equipment
- Result: some models are "hard-wired" to produce job losses from any policy that costs money

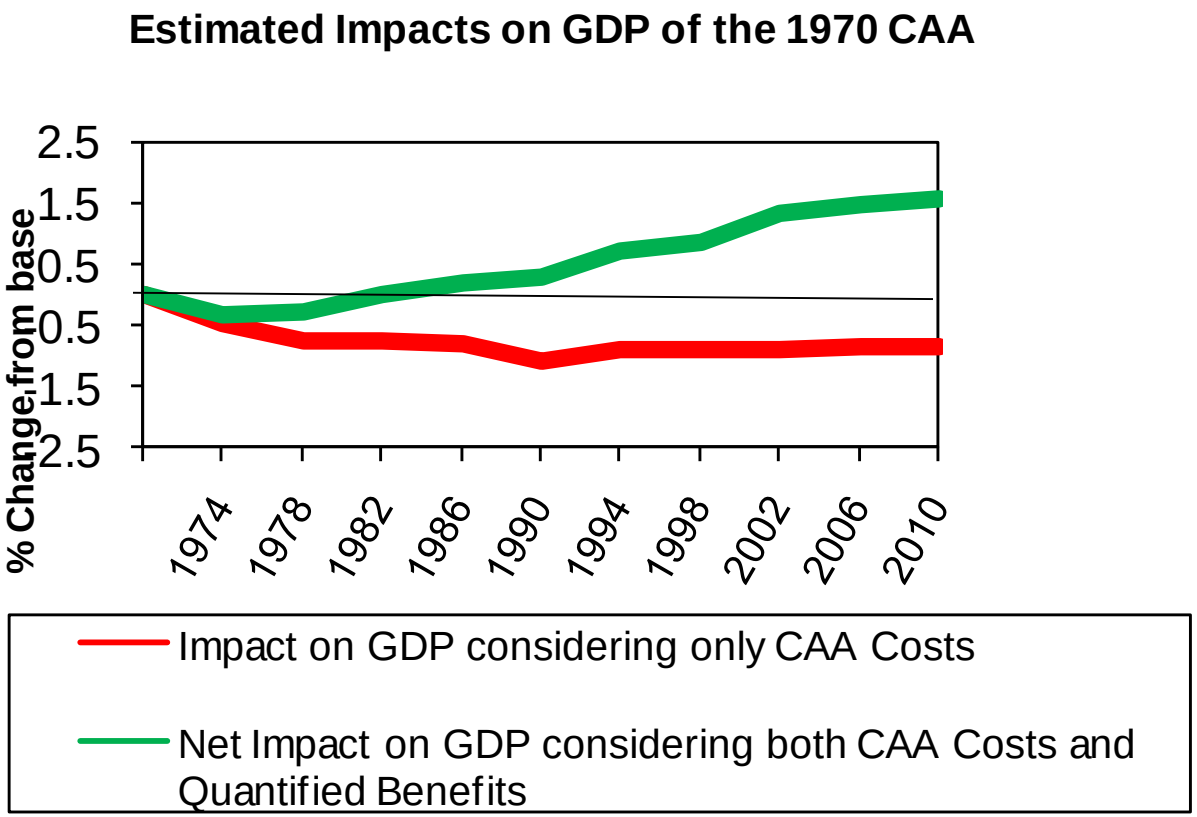
Expert Review of Industry Analyses

- CIBO Report - Professor Jason Shogren, University of Wyoming
  - "authors make ad hoc assumptions that do not address basic economic principles"
- MAPI Report - Professor Richard Howarth, Dartmouth College
  - "The MAPI report is fundamentally flawed, resting on an analytical framework that is scientifically unsound and inappropriate for use in policy evaluation."
- AF&PA Report – Professor Charles Kolstad, University of California
  - "The methodology is fundamentally flawed in many respects; thus the results are useless."

Completing the Cycle:
Clean Air Supports Economic Growth

- Some industry studies examine only the negative impacts of regulations. There are also economic benefits from regulation.
- Harvard Professor Dale Jorgenson and recently, EPA's study of the Clean Air Act benefits and costs, also look at the employment effects from the "benefits" side of regulations.
- Lower demand for health care and more productive workforce leads to growing US economy

The Clean Air Act has supported robust economic growth when the benefits are counted



~$200 billion net increase in GDP for year 2010

Source: Jorgenson (2002)

Summary: Clean Air Regulation and Employment

- Positive impacts: spending on clean air creates jobs:
  - In the regulated industry for O&M
  - In the environmental protection industry
  - In upstream industries providing intermediate goods production (e.g., steel, pumps, filters, machinery)
- Some industry studies only estimate the negative employment impacts
- Environmental improvements make us healthier and this makes us more productive, and the economy more competitive

Costs and Competitiveness

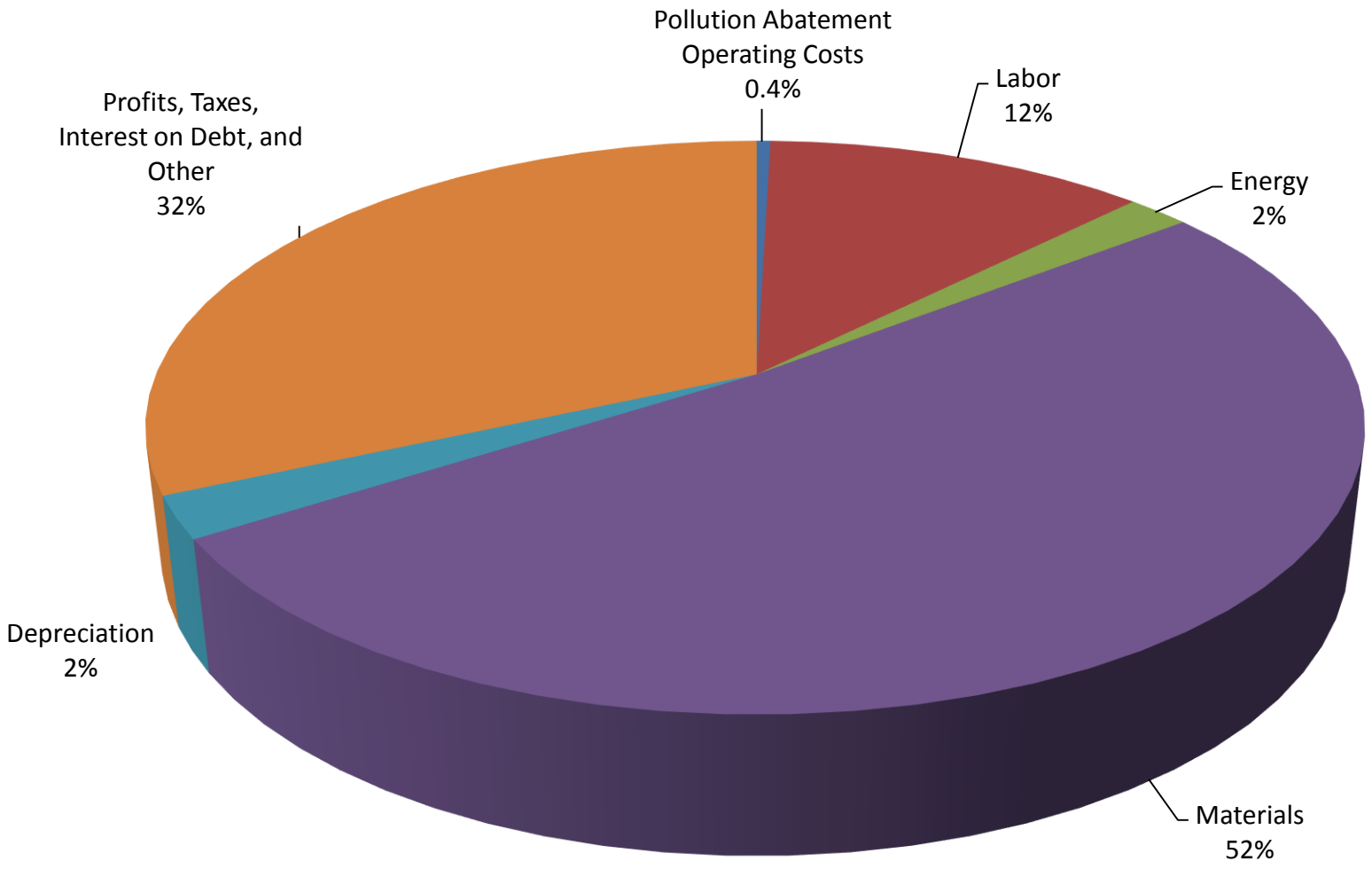
- Concerns that air pollution abatement costs hurt competitiveness.

- Data and studies suggest otherwise.
  1. Environmental protection costs are a very small fraction of total manufacturing costs. Research suggests they play a negligible part in plant location decisions.
  2. The EP market is world wide and growing.
  3. Environmental protection must be done domestically

Pollution Abatement Costs

- Abatement costs are a small fraction of total manufacturing costs, and therefore not an important determinant of international competitiveness.
- The Census Bureau's Pollution Abatement Costs and Expenditures (PACE) survey provides compelling evidence that the relative magnitude of pollution control costs in U.S. manufacturing is quite small.

Manufacturing Cost Categories as a Percentage of Total Revenues

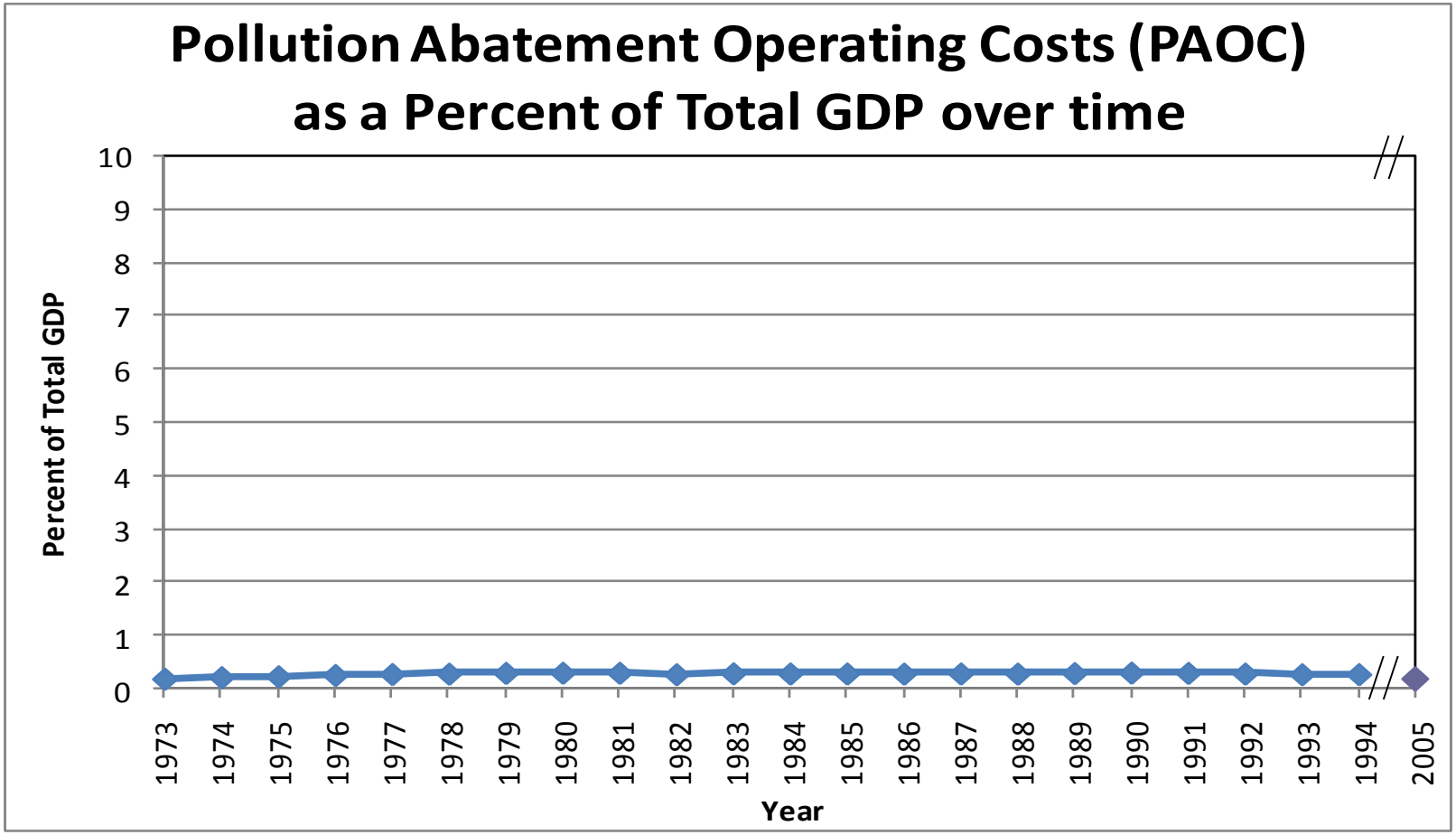


Source: U.S. Census Bureau, Pollution Abatement Costs and Expenditures: 2005
U.S. Census Bureau, Annual Survey of Manufactures: 2005

Do Clean Air Act Regulations Hurt US Competiveness?

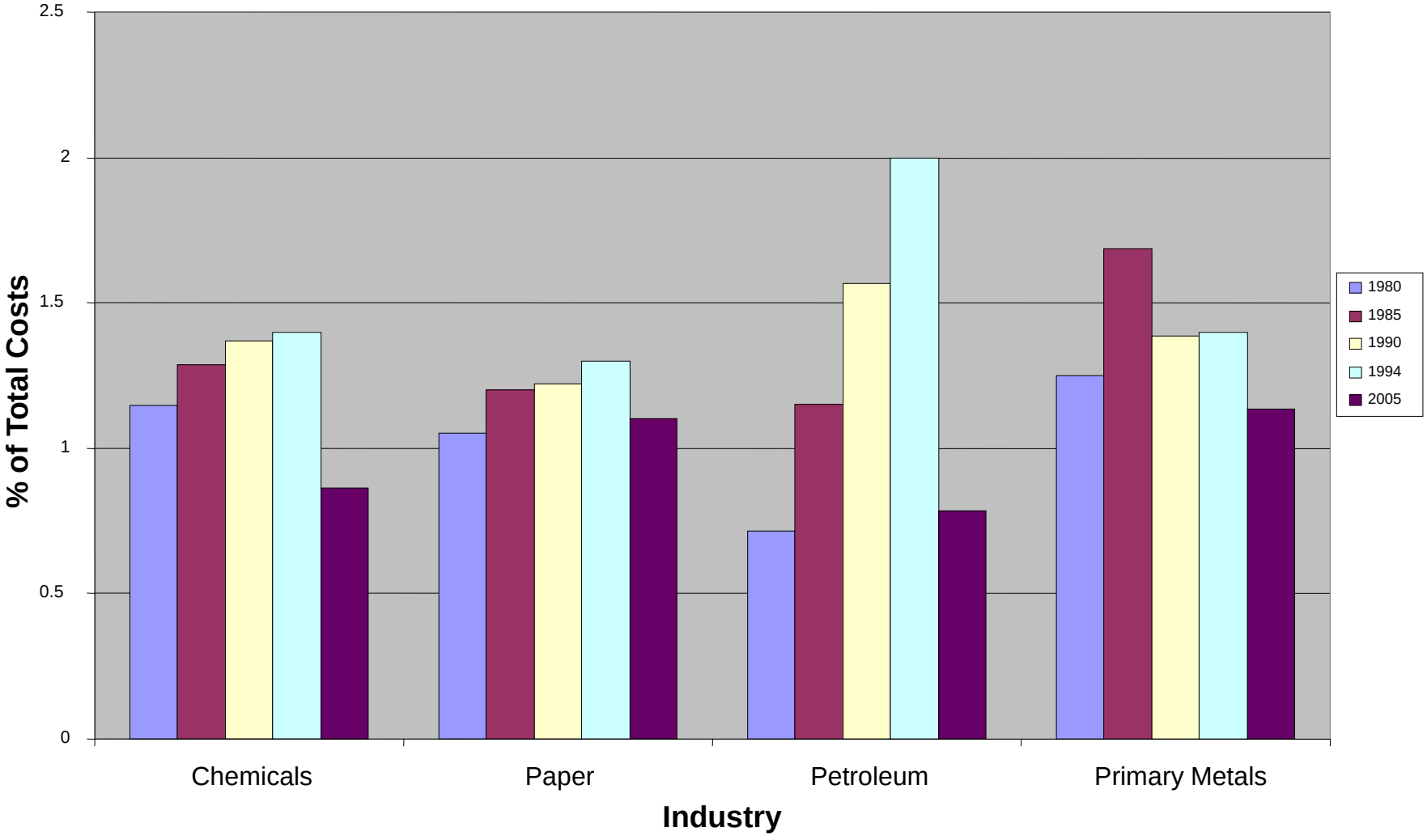
- Jaffe, Peterson, Portney, and Stavins (1995):
  - "There is relatively little evidence to support the hypothesis that environmental regulations have had a large adverse effect on competitiveness…."
- Taylor (2005) found:
  - Environmental regulation is only one factor of many influencing trade flows. Other factors are far more important.
- Levinson (2009) found:
  - Imports are getting cleaner over time too.

Abatement costs remain small despite huge reductions in pollution



Sources: Economic Report of the President, Executive Office of the President and Pollution Abatement Costs and Expenditures Survey, U.S. Census Bureau. No comparable data 1995 -2004

Pollution Abatement Costs as a percent of total costs for the most regulated manufacturing sectors



Clean Air Act Driven Innovation can also Enhance Competitiveness

- Environmental Leadership spawns a world class Environmental Protection (EP) Industry
- The global environmental goods and service market is growing:
  - Roughly $734 billion in 2010
  - Comparable in size to pharmaceutical and aerospace markets
- US environmental protection exports in 2008
  - $44 billion

European Environmental Agencies (2005) , Department of Commerce (2010)

Clean Air Act regulations can spur innovation

- Examples
  - Selective catalytic reduction
  - Ultralow NOx burner technologies
  - Mercury control technology for waste incinerators
- Regulated firms also innovate. $1 spent on environmental pollution control results in a real expense of 87 cents as a result of productivity gains

Morgenstern et al. (2001)

Capital On The Sidelines

- Firms are currently holding records amount of cash reserves

  - Non-financial firms holding **$1.93 trillion** in cash as of 9/10 (WSJ, 12/10/10)

  - Many companies are buying back their own stock; experts predict takeover waves as cash reserves mount (good for Wall Street, but not for Main Street)

Environmental Protection Sends Investments to Infrastructure

- "The thinking is that if firms would simply begin investing this cash in new plants, equipment, and employees, the pace of the recovery would pick up and bring unemployment down. However, many company executives are waiting until the slow pace of the recovery quickens before putting additional cash at risk."

  Study by Cleveland Federal Reserve Bank, Jan. 10, 2011

- "The cash pooling up at companies has the potential to help the economy grow more vigorously and bring unemployment lower – if they start spending it on new plants, equipment, and employees."

  Wall Street Journal 12/21/2010

Conclusions

- Environmental protection improves public health and reduces health care costs, improving economic growth
- Clean air act regulations can create employment through the manufacturing, installation, and maintenance of new equipment
- Air pollution control costs are small relative to other expenses and not a major factor in international competitiveness
- Environmental services is a large and growing export industry

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